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**In The United States Patent and Trademark Office**

Appn. Number: 09/903,302  
Filing Date: 07/10/2001  
Applicant: Mitchell, Matthew P.  
Customer No.: 000037623  
Application Title: Foil Structure for Regenerators  
Examiner/GAU: Nihir Patel/3743

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**TRAVERSE OF ELECTION REQUIREMENT AND PROVISIONAL ELECTION**

Commissioner For Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

In response to the Office Action mailed 03/03/2004, Applicant respectfully requests reconsideration and withdrawal of the requirement of election on the grounds that the embodiments identified by the Examiner as separate inventions are not distinct but are, in fact, closely related, address a common issue in a similar way, and that the three independent claims describing those embodiments (claims 1, 2 and 13) are interlocked in that neither claim 1 nor claim 2 is mutually exclusive of claim 13. Applicant also disagrees with the Examiner's taxonomy of species.

**Election Should Not Be Required**

The three independent claims, and the drawing figures which illustrate the invention, all describe a layer of foil that has grooves on both sides, in patterns that cause the grooves on the two sides to intersect, forming holes. The invention is in the novel arrangement of the grooves,

which generates advantageous flow patterns in fluid flowing in the grooves. Common to the groove pattern in all of embodiments shown is slanting grooves - that is, grooves that do not run either normal to, or parallel to, the overall direction of flow in the regenerator.

In one embodiment, (shown in Figs. 6A, 6B, 8A and 8B), grooves on one side of the foil slant while grooves on the other side of the foil are normal to the overall direction of flow in the regenerator. In the other embodiment (Figs. 9A, 9B, 9C, 10A, 10B) the grooves on both sides of the foil slant. The distinction between these embodiments is expressed in claim 1 (one set of grooves normal to flow) and claim 2 (both sets of grooves slanted relative to the overall direction of flow). Whether the slant is continuous (as in Figs. 6A, 8B, 9A, and 10A) or periodically reversing (as in Figs 6B, 8A, 9B and 9C) is not the significant distinguishing characteristic. The distinction between grooves normal to the overall direction of flow and grooves slanted relative to the flow is that flow in slanted grooves is advancing through the regenerator, whereas flow normal to the overall direction of flow in the regenerator is not. That is true whether the slant of the slanting grooves is continuous or periodically reversing (i.e. zigzag).

Claim 1, illustrated in Figs. 6A, 6B, 8A and 8B, contains the limitation that the grooves on one side of the foil be normal to the overall direction of flow in the regenerator while the grooves on the opposite side are slanted. That arrangement is not excluded from claim 13, in which the layers of foil in a regenerator are, alternately, grooved and solid. Claim 13 requires that grooves on one side of the grooved foil be angled relative to the overall direction of flow through the regenerator but does not preclude the possibility that the grooves on the other side of the foil are normal to the overall direction of flow through the regenerator as in claim 1. Conversely, the requirement of claim 13 that layers of grooved foil and solid foil be alternated does not prevent it from reading on the invention claimed in claim 1, which calls for multiple layers of foil, one of

which is grooved, but other layers of which are not specified and could be solid as in claim 13.

Claims 1 and 13 are thus not "mutually exclusive" as they would have to be to justify restriction under sec. 806.04(f) of the MPEP.

With respect to the invention of claim 2, illustrated in Figs. 9A, 9B, 9C, 10A, and 10B, the grooves on both sides of the grooved foil layer must be slanted relative to overall direction of flow in the regenerator. Claim 13 does not preclude that; it requires that grooves on one side of the grooved foil be angled relative to the overall direction of flow through the regenerator but does not preclude the possibility that the grooves on the other side of the foil are likewise angled relative to the overall direction of flow through the regenerator as in claim 2. Conversely, the requirement of claim 13 that layers of grooved foil and solid foil be alternated does not prevent it from reading on the invention claimed in claim 2, which calls for multiple layers of foil, one of which is grooved, but other layers of which are not specified and could be solid as in claim 13. Claims 2 and 13 are thus not "mutually exclusive" as they would have to be to justify restriction under sec. 806.04(f) of the MPEP.

In these circumstances, applicant contends that the inventions described and claimed in the application are not "distinct" as required by MPEP sec. 806.05. As noted in MPEP sec. 806.04(e), species are not always independent and consideration must be given to "...commonality of operation, function or effect." Here, all variants disclosed and claimed employ layers of foil grooved on both sides, with actively driven flows in grooves on both sides, and operate as regenerators, thus sharing commonality of operation, function *and* effect.

Should election be required as specified by the Examiner, a subsequent divisional application containing claims excluded by the election would thus necessarily contain claims overlapping the claims for the elected species. Although Applicant would not be subject to a

double-patenting objection to claims in the divisional application, the MPEP makes it clear in sec. 806.05 that where inventions claimed are not distinct, restriction "...is never proper."

### **Species Division**

Should applicant fail to persuade the Examiner to reconsider and withdraw the requirement of election, Applicant respectfully requests that the Examiner redefine the species into which Applicant's application is divided. Claim 1 contains the limitation that grooves on one side of a piece of foil contain grooves normal to the overall direction of flow in the regenerator. That arrangement is illustrated in Figs. 6A, 6B, 8A and 8B, and is not limited to the figures listed by the Examiner (i.e. 6B and 8A).

Claim 2, which requires that grooves on both sides of a piece of foil be slanted relative to the overall direction of flow in the regenerator (i.e. not normal to that flow) is illustrated in Figs. 9A, 9B, 9C, 10A and 10B, but not by Figs. 6A and 8B as specified by the Examiner.

Claim 13, which requires layers of solid foil interspersed with layers of grooved foil, is illustrated by Figs. 6A, 6B, 8A, 8B, and 9A, 9B and 9C which show patterns of grooved foil that could be incorporated in alternate layers; Fig. 10A shows the combination of solid layers of foil and a layer of grooved foil as claimed in Claim 13; Fig. 10B shows the effect of interaction of streams of fluid flowing on opposite sides of the grooved foil of Fig. 10A, and Fig. 11 illustrates the assembly of a regenerator by rolling alternate layers of solid foil and grooved foil in accordance with the invention of claim 13. The Examiner's taxonomy connects only Figs. 6B, 8A, 9B and 9C to Claims 1 and 13, omitting Figs. 6A, 8B, 9A, 10A, 10B, and 11.

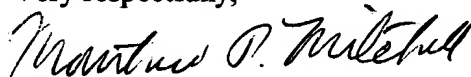
The problem with the Examiner's definition of species can be illustrated by an analogy. In a population comprising long-tailed and short-tailed cats of both sexes, it would be proper to divide the population into two species consisting of long-tailed cats and short-tailed cats. It would

not be proper to divide the population into male cats (both long- and short-tailed) and female cats (both long- and short-tailed) and declare them to be separate species. Here, as in the division-by-sex analogy, the Examiner's division appears to be based on the wrong set of attributes.

Should Applicant succeed in persuading the Examiner to reconsider his taxonomy of species but fail to persuade the Examiner to reconsider and withdraw the requirement of election, Applicant would respectfully suggest that the division be made between claim 1 (Figs. 6A, 6B, 8A, 8B) on the one hand, and claims 2 and 13 (Figs. 6A, 6B, 8A, 8B, 9A, 9B, 9C, 10A, 10B and 11) on the other hand. If the Examiner were to prescribe that division, Applicant would then provisionally elect to proceed with claims 2 and 13 (Figs. 6A, 6B, 8A, 8B, 9A, 9B, 9C, 10A, 10B and 11) and claims dependent upon claims 2 and 13 (i.e. claims 4, 6, 8, 10, 12 and 14-20).

Should Applicant fail to persuade the Examiner to reconsider and withdraw the requirement of election, and also fail to persuade the Examiner to reconsider his taxonomy of species, Applicant provisionally elects to proceed with the invention claimed in claims 1 and 13 of the above application and the claims dependent upon those claims, which are claims 3, 5, 7, 9, 11, and 14-20. Drawing figures referenced by Applicant as supporting those claims are Figs. 6A, 6B, 8A, and 8B with respect to claim 1, and Figs. 6A, 6B, 8A, 8B, 9A, 9B, 9C, 10A, 10B and 11 with respect to claim 13.

Very respectfully,



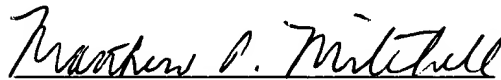
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2004 Mar 22

A handwritten signature in cursive script that reads "Matthew P. Mitchell". The signature is written in dark ink and is positioned above the printed name of the applicant.

Matthew P. Mitchell, Applicant